



Mental & Neurological Health

AND THE MILLENNIUM
DEVELOPMENT GOALS



Prepared by the Global Network for Research
in Mental and Neurological Health



Including an abbreviated version of
*Neurological, Psychiatric and Development Disorders:
Meeting the challenge in the developing world*

Mental and neurological health and the Millennium Development Goals

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Acronyms and abbreviations

AIDS	acquired immunodeficiency syndrome
BOD	burden of disease
CBR	community-based rehabilitation
CDC	Centers for Disease Control and Prevention (USA)
CT	computed tomography
DALYs	disability-adjusted life years
HIV	human immunodeficiency virus
IOM	Institute of Medicine (USA)
MDGs	Millennium Development Goals (UN)
MNH	mental and neurological disorders
NGO	nongovernmental organization
NIH	National Institutes of Health (USA)
PTSD	post-traumatic stress disorder
SSRIs	selective serotonin reuptake inhibitors
STIs	sexually transmitted infections
TB	tuberculosis
TCA	tricyclic antidepressants
UN	United Nations
WHO	World Health Organization
YLD	years lived with disability

Foreword

In preparation for the WHO Global Burden of Disease study in 2000, the Global Forum for Health Research supported a series of projects to help identify information on the burden of disease in low- and middle-income countries. Catalytic research studies were implemented mainly in areas that had been relatively neglected in the 1990s. One such area was mental and neurological health; comparatively little was known about its pattern, depiction, description and the extent to which mental and neurological health is compromised in low- and middle-income countries.

In 1999, the Global Forum initiated a project to evaluate the status of mental and neurological health in low- and middle-income countries and to begin to fill in the gaps in knowledge. The Global Forum, the Centers for Disease Control (Atlanta) and four institutions of the US National Institutes of Health (the National Institute for Mental Health, National Institute of Neurological Disorders and Stroke, National Institute for Child Health and Development, and the Fogarty International Center) contracted the US Institute of Medicine to undertake this study. The report, *Neurological, Psychiatric and Developmental Disorders: Meeting the challenge in the developing world*, was published in 2001. In early 2004, the Global Forum requested the Global Network for Research in Mental and Neurological Health to advocate for the integration of mental and neurological health into the mainstream of health decision-making and social development programmes, on the basis of the findings of the original publication.

The present report is intended to disseminate the main findings of the 2001 IOM publication and to highlight some of the challenges that poverty, stigma and health inequities add to the health problems of people in low- and middle-income countries and efforts to reach the Millennium Development Goals.

The information presented in this publication, and in the earlier report on which it is based, reflects a biomedical perspective of the problems and solutions for neurological and mental health. While highlighting a number of medical interventions, the report calls attention to the need for less costly solutions to ensure good mental and neurological health for people in low- and middle-income countries.

Identifying the full extent of the challenges and appropriate solutions will require going beyond a biomedical perspective. It is the intention of the Global Forum to continue to fill in the gaps and enhance our knowledge about mental and neurological health by widening the scope of research and bringing other important stakeholders to the table. These include researchers from disability studies programmes and individuals, families and disability organizations with first-hand knowledge and expertise in the field of mental and neurological health.

Much of our work in the coming years will focus on exploring inequities in health and health research that result in disadvantage for groups of people on the basis of ability, gender, race, class and other social characteristics.

This includes exploring, for example:

- the inherent limitation in measuring their health using indicators such as DALYs. By definition, DALYs assume a “reduced value” of lives lived with a disability; use the term disability interchangeably with ill health; assume that living with a disability represents a net drain on society; and assume that individuals with a disability “suffer” an existence that lies somewhere between living and an anticipated premature death;
- how specific cultural understandings about disability, difference and diversity may contribute to compromised health and well-being for persons identified with mental, neurological and developmental “disorders” and to biases in medicine and health research, policies and practice;
- ways to foster the development of new tools to measure health and the social, physical, spiritual and mental determinants and co-requisites of health.

Under-investment in health research for the needs of people in low- and middle-income countries has been symbolized in the expression the “10/90 gap”. The document presented here is a useful tool for advocating for more research to improve mental and neurological health. It is clear, however, that unless we widen our knowledge base, develop new instruments to measure health and remove biases from the way we conceptualize and portray disability and conduct research, our knowledge about mental and neurological health and the “10/90 gap” will remain fragmented and incomplete. Global research efforts must lead to real improvements in health and reduce inequities in health and health research.

Professor Stephen Matlin
Executive Director
Global Forum for Health Research

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Chapter 1

Mental and neurological health: meeting the challenge in the developing world

Neurological, psychiatric and developmental disorders exact a profound economic and personal toll worldwide, yet public and private health-care systems, particularly in developing countries, have paid little attention to them. Today, growing recognition of the prevalence of these disorders and the availability of prevention strategies and cost-effective treatment make it both important and possible to substantially reduce their impact, even where resources are limited.

It is now widely accepted, and reflected in the Millennium Development Goals (MDGs), which were adopted at the United Nations' Millennium Summit in September 2000, that socioeconomic development and population health must advance together to be sustainable in the long term. The MDGs are particularly relevant to efforts to ameliorate mental and neurological health (see Chapter 1). Improvements in population health are not merely or even necessarily a by-product of economic growth. They are a prerequisite and a driving force of economic and social productivity. Reductions in maternal and infant mortality, improvements in nutrition and environmental sanitation, and control of communicable diseases have made important contributions to economic growth. Conversely, high levels of preventable morbidity and mortality, survival with chronic disability, reduced quality of life and widespread demoralization are a drain on society's resources and impede overall development.

Neurological, psychiatric and developmental disorders encompass a wide range of disabling conditions, including epilepsy, stroke, schizophrenia, unipolar depression, bipolar disorder, mental retardation, cerebral palsy and autism. Although diverse, these conditions are increasingly recognized as disorders of the brain and its neural connections interacting with the environment; accordingly, in this report they are often referred to in the aggregate as *brain disorders*.

Brain disorders are currently estimated to affect as many as 1.5 billion people worldwide – a number that is expected to grow as life expectancy increases. Since most disorders affecting the brain and its neural connections result in long-term disability and many have an early age of onset, measures of prevalence and mortality vastly understate the disability they cause. Social isolation and stigma often add to the medical and financial burden borne by patients and their families.

The breadth and diversity of brain disorders present a complex task to researchers attempting to measure their impact. Health-care economists have widely adopted the term *burden of disease* (BOD) to express a combination of the frequency and distribution of a disorder or group of disorders, the death and disability they cause, and the resulting economic impact. Brain disorders are responsible for at least 27 per cent of all years lived with disability in developing countries. The collective impact of brain disorders is partially captured by disability-adjusted life years (DALYs), a

measure of the burden of disease that combines years lost as a result of death and disability, the latter being weighted according to severity (see Table 1).

Table 1 Contribution of brain disorders to disability-adjusted life years (DALYs) and mortality in low- and middle-income countries, estimates for 2003				
Condition	DALYs ('000s)	% of total DALYs	Deaths ('000s)	% of total deaths
All disease	1 143 039		50 276.4	
Unipolar depressive disorders	56 936	5.0%	11.1	0.0%
Cerebrovascular disease	28 779	2.5%	4 758.0	9.5%
Self-inflicted injuries	11 541	1.0%	755.5	1.5%
Bipolar depressive disorders	7 791	0.7%	0.3	0.0%
Alcohol-use disorder	15 113	1.3%	68.2	0.1%
Schizophrenia	12 708	1.1%	21.3	0.0%
Obsessive-compulsive disorder	4 378	0.4%	0.0	0.0%
Alzheimer and other dementias	6 344	0.6%	186.0	0.4%
Drug-use disorder	5 770	0.5%	72.3	0.1%
Panic disorder	6 324	0.6%	0.0	0.0%
Epilepsy	6 843	0.6%	115.3	0.2%
Post-traumatic stress disorder	2 863	0.3%	0.1	0.0%
Multiple sclerosis	1 171	0.1%	8.2	0.0%
Parkinson disease	915	0.1%	52.7	0.1%
Other neuropsychiatric disorders	28 139	2.5%	192.2	0.4%
Total brain disorders	195 615	17.1%	6 241.1	12.4%

Source: World Health Organization, Burden of Disease Project, Geneva, 2004.

When disability is taken into consideration along with death, brain disorders comprise nearly 15 per cent of the burden of disease in developing countries. Current figures are seriously underestimated, however, since many patients with these conditions in developing countries, particularly children, are not diagnosed and do not receive medical care. Estimates indicate that in the United States 12 to 18 per cent of children are disabled in some way. The numbers are likely to be substantially higher in developing countries, where children are also more frequently exposed to infectious diseases and nutritional deficiencies. As improvements in health care and sanitation enable more children in the developing world to survive, the number of children with developmental disabilities is very likely to rise without concomitant efforts to reduce their occurrence.

Today’s rapidly changing global economy poses a significant challenge to the developing world. To meet it, developing countries must foster healthy, educated workers, a process that begins with prenatal care and continues to adulthood. Since many brain disorders interfere with education as well as health, they present a threat to economic development. For low-income countries, the social and economic consequences of ignoring the burden of brain disorders are large and will continue to grow.

Background

Origin of the project

In 1999, the Global Forum for Health Research initiated a study of mental and neurological disorders in developing countries. The work was contracted to the United States' Institute of Medicine (IOM) and attracted the support of the Centers for Disease Control and Prevention (Atlanta, USA) and four institutions of the US National Institutes of Health (NIH): the National Institute for Mental Health; the National Institute of Neurological Disorders and Stroke; the National Institute for Child Health and Development; and the Fogarty International Center.

The Committee on Neurological, Psychiatric and Developmental Disorders in Developing Countries, convened by the US Institute of Medicine, was charged with preparing a consensus report that would define the increasing burden caused by neurological, psychiatric and developmental disorders in developing countries, and to identify opportunities for effectively reducing that burden with cost-effective strategies for prevention, diagnosis and treatment. The committee was also asked to identify areas for research, development and capacity strengthening that would contribute most significantly to reducing the overall burden of these disorders in developing countries, and to focus on several major and representative groups of conditions: developmental disabilities; epilepsy; schizophrenia; bipolar disorder; unipolar depression; and stroke.

The IOM study led to publication in 2001 of the *Neurological, Psychiatric and Developmental Disorders: Meeting the Challenge in the Developing World* report. The authors of this report are a highly prestigious group of experts with extensive experience in both developing and developed countries. The report was well received and disseminated widely.

Impact analysis

An analysis of the impact of the report's findings on the health situation in developing countries revealed that mental and neurological health, more often than not, is not seen as part of mainstream public health. This has two important consequences: one, the report does not always reach its main target group, i.e. decision-makers in health and social development; and two, those who read it (experts in the fields of mental and neurological health) very often feel that they lack the means to implement the report's recommendations.

It became clear that a reorganization of services for people with mental and neurological disorders has to be embedded into general health and social sector reform. Hence, methods and instruments need to be developed to facilitate this process. The IOM report may serve as the basis for addressing this problem. For this to happen, however, the Global Network for Research in Mental and Neurological Health (see Box 1) took the initiative for adapting the IOM report in such a way that

Box 1

The Global Network for Research in Mental and Neurological Health

The Global Network for Research in Mental and Neurological Health, established in 2001, is a not-for-profit organization registered in the United States. Guided by the Network's mission, 33 institutions in 25 countries, in both developing and industrialized countries, collaborate:

- to support key research and implementation of needed services for mental and neurological disorders in poor populations;
- to reduce the long-term cost of mental and neurological disabilities;
- to foster the development and implementation of basic local infrastructure to carry out these tasks.

These goals will be achieved through translation of research and policy into action, capacity building and promotion of sustainability.

The Network's advocacy programme

The medium-term objectives of the Network's advocacy programme on integrating mental and neurological health into mainstream health and social development policies include:

- demonstrating that mental and neurological health is a prerequisite for improving health in general, particularly in poor and deprived populations, and hence contributes directly to achieving the Millennium Development Goals;
- promoting and facilitating the dialogue between specialists in mental and neurological health and decision-makers in health and development;
- producing material suitable for advocating mental and neurological health in the general context of health system research, health policy development and health sector reform processes.

it would become more amenable to its main target group, the decision-makers in health and social development. More specifically, this work was guided by the following objectives:

- produce an abbreviated version of the IOM report with health policy- and decision-makers in mind as target groups;
- produce an introductory chapter showing:
 - the linkage between mental and neurological health on the one hand, and general health and cross-cutting issues (such as gender and poverty) on the other hand;
 - the contribution that mental and neurological health can make to achieving the Millennium Development Goals;
- produce and print this document in three languages: English, Spanish and French;
- develop and apply a strategy for the targeted dissemination of this abbreviated version of the IOM report.

Scope

This report provides an evidence base to inform steps needed to address brain disorders in developing countries. The report committee considered a wide base of scientific evidence in order to:

- define the burden of morbidity and disability due to brain disorders;
- describe the causes and risk factors associated with these disorders;
- identify effective, affordable strategies for their prevention and treatment, and rehabilitation of the people afflicted by brain disorders;
- identify mechanisms for incorporating care for brain disorders into existing health-care systems in developing countries.

Magnitude of the problem

Disease control efforts in the developing world have been effective in increasing life expectancy and reducing fertility. The result has been a demographic transition from predominantly youthful populations to older and ageing ones. This transition has been accompanied by increases in the health problems associated with older people who are particularly vulnerable to chronic diseases, including a number of brain disorders. As a consequence, many low-income countries now face the double burden of increases in these non-infectious diseases and continuing high levels of infectious ones, including some that result in brain disorders (e.g. AIDS and cerebral malaria).

Each of the six classes of brain disorders examined in this report has a range of personal, social and economic impacts:

- **Developmental disabilities** include conditions such as mental retardation, behavioural disorders and cerebral palsy that result from abnormal development or injury to the brain and central nervous system during infancy or childhood. These disorders often impose enormous personal, social and economic costs as a result of early onset and lifetime disability. Many of the causes of developmental disabilities – including genetic and nutritional factors, infectious diseases and traumatic events – are particularly common in low-income countries.
- **Epilepsy** affects an estimated 60 million people in developing countries, roughly 85 per cent of the total number affected worldwide. The disorder commonly attacks young adults in the most productive years of their lives and frequently leads to their being unemployed. Because of stigmatization and false beliefs, epilepsy is frequently untreated and even unrecognized in the developing world.
- **Schizophrenia** causes severe and chronic disability, due in part to its connotations of “insanity”. The disorder is estimated to affect 33 million people in developing countries. Schizophrenia, however, can be controlled with a variety of treatments that offer patients significant improvements in productivity and quality of life.
- **Bipolar disorder** accounts for about 11 per cent of the neuropsychiatric disease burden in developing countries. The disorder is characterized by alternating episodes of extreme elation (mania) and severe depression. Between 25 and 50 per cent of patients in developed countries with bipolar disorders attempt suicide.

and as many as 15 per cent are successful. Treatments that significantly reduce the debilitating symptoms of the disease are available, yet few of these treatments are being used in developing countries.

- **Depression** is estimated to be the leading cause of disability worldwide. Its risk factors include family history of the disease, chronic social adversity and poverty. Because depression typically results from a combination of causes, prevention and treatment require a multifaceted approach. In developing countries, this approach may involve a combination of health care, public health awareness, community care and socioeconomic development.
- **Stroke** and its associated disability are increasing in developing countries, where the disorder is projected to become the fifth leading condition contributing to the disease burden by 2020. Because of the high risk of death, long-term disability and recurrence after a first stroke, prevention is key to reducing the public health impact of cerebrovascular disease.

Burden of disease statistics do not fully express the social and economic losses suffered by patients, their families and the community because of brain disorders. The social and economic demands of care, treatment and rehabilitation strain entire families, seriously diminishing their productivity and quality of life. The stigma often associated with these disorders adds to the burden; indeed, in some communities the stigma leads to denial of basic human rights.

Despite the burden of disease represented by brain disorders, these conditions are largely absent from the health agendas of most countries. The need for attention is particularly urgent in the developing world, where poverty and brain disorders tend to reinforce each other, and where the vicious cycle is frequently exacerbated by gender inequalities. Yet there is some hope in the fact that in some developing country settings, people have drawn on their strong family and community relationships to develop programmes that provide cost-effective health care for people affected by mental and neurological disorders.

Findings and future strategies

Where resources are scarce, policy-makers face difficult choices in allocating limited funds for health care. Such decisions are best made on the basis of rigorous evaluation of the efficacy of proposed interventions and, for those interventions that prove efficacious, their cost-effectiveness. Since most brain disorders impair cognitive function, the determination of cost-effectiveness must encompass the costs associated with prevention, detection, treatment, rehabilitation, chronic care and lost wages as well as the impact on family members. Because only preliminary and limited evidence is available, more research will be required to refine the calculations of these costs and apply them in developing countries. Since health-care interventions are only as good as their implementation, research on cost-effectiveness must also address health-care management as well as prevention and treatment outcomes. Thus, the expansion of health-care systems in developing countries to include cost-effective care for brain disorders requires not only increased capacity for delivery of services but also increased capacity for operational research to evaluate the quality and

effectiveness of care. The findings of such research would guide an iterative process of improving clinical care at affordable costs.

Review of prevention, treatment and rehabilitation programmes in developing countries and of cost-effective treatments in both developed and developing countries reveals several effective interventions for brain disorders. Some developing countries have successfully integrated low-cost prevention, screening and treatment methods for developmental disabilities, epilepsy and depression into primary health-care programmes. Similarly, some have created affordable, community-based rehabilitation programmes, which help people disabled by brain disorders to live as normally as possible. Where these programmes provide good care, they serve as a starting point for addressing the burden of brain disorders in the developing world. However, the existence of effective treatments alone does not ensure programmatic success. Programmes need to be designed and implemented according to the needs and resources of each location. A “one-size-fits-all” approach is not likely to succeed.

Determination of the appropriate level of effective, affordable care for brain disorders depends on cost-effectiveness analyses for a range of treatments in different systems of health care. Variability among communities in their recognition of neurological and psychiatric illness, their expectations for medical care and their ability to pay for drugs and other services complicates choices. Optimal approaches will reflect local costs and benefits.

Once care for brain disorders has been incorporated into a system of health care, maintaining a cost-effective programme will require monitoring, evaluation and investigation of alternatives. Moreover, research on the cost-effectiveness of treating brain disorders is a key element in educating governments, missions and nongovernmental organizations (NGOs) on the affordability of these services.

The strategies presented in the chapters that follow aim at reducing the overall burden of brain disorders.

To reduce the burden of brain disorders now

Strategy 1.

Increase public and professional awareness and understanding of brain disorders in developing countries, and intervene to reduce stigma and ease the burden of discrimination often associated with these disorders.

Both the general public and health professionals may be unaware that effective, affordable treatments are available. Educational programmes should be tailored to the needs of local communities, and messages adapted to local cultural beliefs. Advocacy groups, educators, religious leaders and traditional healers can be effective in delivering this information. Governments can reinforce these efforts with laws that protect people with brain disorders from abusive practices, ensure access to health care and prevent discrimination in education, employment, housing and other opportunities.

Strategy 2.

Extend and strengthen existing systems of primary care to deliver health services for brain disorders. Secondary and tertiary centres should train and oversee primary care staff, provide referral capacity and provide ongoing supervision and support for primary care systems in developing countries.

Many countries have specific disease-control and primary care programmes for infectious diseases and maternal and child health. These programmes can be expanded to include effective services for prevention, identification, treatment, rehabilitation and surveillance of brain disorders. Integration of care for brain disorders into the primary health-care system should occur as part of national policy. Because diagnosis and treatment of these disorders often requires specialized skills and training, primary care programmes must be closely linked with secondary and tertiary facilities, such as district and regional hospitals. Cooperative funding for this additional care should come from national and local governments, international NGOs and development agencies.

Strategy 3.

Make cost-effective interventions for brain disorders available to patients who will benefit. Financial and institutional constraints require selectivity and sequencing in setting goals and priorities. The continued implementation of these interventions should also be informed by ongoing research to reveal the applicability and sustainability of such programmes.

Cost-effective interventions are available now to address much of the disease burden (see Table 2).

To the extent possible, treatment programmes for brain disorders should follow best-practice guidelines. Where this is not possible because of capacity or resource limitations, however, implementation of component practices is likely to be more cost-effective than inaction. Adapting existing interventions to local levels of resource availability is feasible, and standard approaches for assessing the cost-effectiveness of health-care delivery should be used to this end. Once care for brain disorders has been incorporated into a system of health care, maintaining a cost-effective programme will require monitoring, evaluation and comparison with alternatives.

To create options for the future

Strategy 4.

Conduct operational research to assess the cost-effectiveness of specific treatments and health services in local settings, along with epidemiological research to monitor the incidence, prevalence and disease burden of brain disorders in developing countries.

Table 2
Examples of cost-effective interventions for management of neurological, psychiatric and developmental disorders

Condition(s)	Primary and secondary prevention goals	Treatment and management modalities
Developmental disabilities	Provision of folic acid and iodine supplements to women of childbearing age Expand vaccination programmes and other proven methods of infectious disease control	Early detection and treatment of infections that threaten the nervous system Implement prenatal, newborn and development screenings
Epilepsy	Public education to destigmatize the disorder and to create awareness of available treatments Prevention and treatment of cysticercosis Reduce incidence of head injury, brain infection and parasitosis	Phenobarbital and phenytoin Low-cost carbamazepine and valproate
Schizophrenia	Public education to destigmatize the disorder Suicide prevention Relapse prevention	Low-cost antipsychotic drugs, like chlorpromazine and haloperidol Community rehabilitation programmes for patients to improve social and occupational skills Psychosocial interventions to reintegrate patients into family and community life
Major depression	Public education to destigmatize the disorder and to create awareness of available treatments Early identification and counselling of high-risk individuals Suicide prevention Relapse prevention	Tricyclic antidepressants and, where available, low-cost SSRIs Adjunctive problem-solving and interpersonal psychotherapy
Bipolar disorder	Early identification and counselling against substance abuse of high-risk individuals Relapse prevention	Long-term treatment with lithium, carbamazepine, valproate or other agents Adjunctive psychosocial treatments
Stroke (cerebrovascular disorders)	Utilize public health and education strategies for lowering stroke-related risk factors (e.g. hypertension, smoking, diet and exercise)	Control hypertension with low-dose thiazide, beta blockers and low-cost statins and ACE inhibitors Sulphonylureas with metformin if needed for diabetes

Source: Institute of Medicine (IOM). *Neurological, Psychiatric, and Developmental Disorders: Meeting the challenge in the developing world*. National Academy Press, Washington DC, 2001.

Because of limited knowledge about the delivery of appropriate interventions in developing countries, there is a need for continuing research to identify local risk factors and their prevalence, to estimate the economic costs associated with these disorders, to assess cost-effective modes of prevention and treatment, and to develop and evaluate approaches for overcoming non-financial barriers to implementation.

Strategy 5.

Create national centres for training and research on brain disorders in developing countries. Link these centres with institutions in high-income countries through multi-centre research projects, staff exchanges and training, and Internet communication.

National centres for training and research can conduct applied research that is tailored to local needs and resources while simultaneously developing the technical capacity of professional and community health-care providers. Such centres can also provide leadership to establish priorities and develop planning strategies. These centres should establish and coordinate professional information networks as repositories of knowledge on effective prevention and intervention strategies, training programmes and research findings.

Strategy 6.

Create a programme to facilitate competitive funding for research and for the development of new or enhanced institutions devoted to brain disorders in developing countries. This effort should be global, and spearheaded by the Global Forum for Health Research, the Global Network for Research on Mental and Neurological Health, the World Health Organization (WHO) and well-funded research centres, such as the NIH and the CDC. To ensure the sustainability of the programme, major donors – such as the World Bank, foundations and governmental and nongovernmental aid organizations – must commit initial investments to this effort, and longer-term annual budgets must be established.

The integration of brain disorders into primary care, with monitoring and assistance from secondary and tertiary centres in developing countries, will require broad international support and multiple funding sources. This support should include collaborative research with institutions in developed countries as well as opportunities for training of professionals from developing countries in operational research and surveillance. Substantial long-term funding will be required to develop a worldwide network of national training and research centres, and to enable the participation of researchers in developing countries.

Conclusion

A growing body of evidence indicates that the social and economic impact of neurological, psychiatric and developmental disorders is large and increasing. Present figures demonstrate most impressively and convincingly the impact of brain

disorders, particularly in the developing world, yet these disorders have been largely ignored by the health systems of those countries.

Immediate and long-term remedies exist and could significantly reduce the burden of brain disorders in the developing world. These include low-cost preventive and diagnostic measures, medicines, and therapeutic and rehabilitative techniques. The benefits of these remedies could be maximized if they were implemented through a comprehensive health-care system, with operational research being carried out on needs and cost-effectiveness in local settings. The identification and testing of interventions for brain disorders in developing countries should eventually yield more and better strategies. Research on incidence, prevalence and socioeconomic impact will provide the information needed to set goals and priorities.

A sustained, comprehensive and integrated effort to reduce brain disorders in developing countries will require broad institutional support. This support could be achieved through cooperative links among a broad spectrum of organizations associated with brain disorders, spearheaded by the sponsors of this report: the Global Forum for Health Research, the US National Institutes of Health (National Institute of Mental Health, National Institute of Neurological Disorders and Stroke, National Institute of Child Health and Human Development, and the Fogarty International Center) and the US Centers for Disease Control and Prevention.

Chapter 2

Mental and neurological health, gender and the Millennium Development Goals

Introduction

In September 2000, 189 member states of the United Nations (UN) ratified the Millennium Declaration, a set of time-bound and measurable goals and targets delineating a road map for development. Placed at the heart of the global agenda, they are now called the Millennium Development Goals (MDGs).

Box 2

The Millennium Development Goals

- Eradicate extreme poverty and hunger
- Achieve universal primary education
- Promote gender equality and empower women
- Reduce child mortality
- Improve maternal health
- Combat HIV/AIDS, malaria and other diseases
- Ensure environmental sustainability
- Develop a global partnership for development

Progress towards the achievement of the MDGs is uneven and too slow. The UN has argued that a large majority of nations will reach the MDGs only if they receive substantial support – advocacy, expertise and resources – from outside; and that the challenges for the global community, in both the developed and the developing worlds, are to mobilize financial support and political will, re-engage governments, reorient development priorities and policies, build capacity and reach out to partners.

Mental and neurological disorders (MNH) cause a heavy burden across the world. This burden is influenced by a number of socio-demographic variables including gender. MNH is relevant to the generic inequities of low- and middle-income countries, including poverty, gender, age and difficulties in accessing services. None of the MDGs specifically refers to mental and neurological health, but nonetheless, MNH is relevant to most, if not all, of them. This chapter will argue that a further key factor crucial for the attainment of the MDGs is to pay attention to their mental health aspects, which have hitherto been largely ignored.

The prevalence of mental and neurological disorders

The magnitude of mental and neurological disorders may be described in terms of prevalence, disability, chronicity and mortality. Contrary to prevalent misconceptions, mental and neurological disorders are at least as common in low-income countries as in established market economies (IOM 2001), and are not simply a problem of rich countries or indeed of rich populations in poor countries, as is sometimes erroneously argued. The prevalence of psychosis is around 0.5 per cent to 1 per cent (IOM 2001) and the prevalence of common mental disorders (mostly depression and anxiety) is between 10 per cent and 20 per cent in most studies, with a number of studies finding substantially higher rates in relatively poor populations (Mirza and Jenkins 2004; IOM 2001).

The prevalence of neurological disorders approaches 15 per cent and may be greater (IOM 2001). The prevalence of substance abuse is highly culture specific, but is a growing problem everywhere. The 2000 burden of disease study estimates that illicit opioid use make up 0.7 per cent of global DALYs (Mathers et al. 2002). Post-traumatic stress disorder (PTSD), which is now recognized to be a common problem in post-conflict situations affecting a high proportion of the overall population, leads to dysfunction and persists over a long time, but researchers and donors often unfortunately focus on it to the exclusion of the overall MNH needs of the population.

The burden of MNH

Neuropsychiatric disorders contributed 13 per cent of the global burden of disease in 2001 (WHO 2002), and are estimated to rise to 14.6 per cent in 2020; they represent four of the ten leading causes of disability, and 28 per cent of years of life lived with a disability (YLD). Stroke, in addition to causing disability among survivors, is the second to fourth leading cause of death after the age of 5 years in virtually all countries. Analysis of data from a population-wide survey of Burundi carried out in 1998 found 36 per cent of the population to be distressed (Baingana et al. 2004). A multi-site epidemiological study found rates of mental disorders to range from 4 per cent to 26 per cent (WHO World Mental Health Survey Consortium 2004).

Depression is the fourth leading cause of total disease burden, contributing 4.4 per cent of DALYs, and more than 12 per cent of YLD. According to *The World Health Report* (WHO 2001a), the leading cause of YLD is unipolar depression in all ages, as well as for those aged 15–44 years. This holds true for both sexes as well as when data is disaggregated for males and for females. The burden of disease study has consistently found depression to be prevalent at a much higher rate (4:1) in women. Depression is not just a significant problem in the West. A study in Ethiopia found that depression contributed 7 per cent of the disease burden using DALYs (Abdulahi et al. 2001) and a similar study in Zimbabwe found depression to be second to HIV/AIDS in terms of disease burden. Behavioural problems add to the burden: figures for 2000 show that unsafe sex contributes 2.9 per cent to the BOD; alcohol,

3.5 per cent; and tobacco, 3.3 per cent (WHO 2002). The comparison with infectious diseases is as follows: tuberculosis (TB) contributes 2.5 per cent, measles 1.8 per cent and malaria 2.9 per cent.

These DALY figures are, of course, problematic because the disability weights used to derive them are still arbitrary: epidemiological figures are still only estimates in many countries; there is double counting because of co-morbidity within neuropsychiatric disorders; and undercounting because of co-morbidity between mental illness and physical illness. There is no inclusion within the DALY metric of family burden or of burden to society, e.g. absence due to sickness, labour turnover, accidents, reduced productivity, consequences for children, etc.

Overall, it is expected that the DALYs are substantial underestimates for mental disorders, rather than overestimates.

Suicide is estimated as the 15th leading cause of death. Recorded suicide rates vary from country to country and are either simply not measured or are recorded badly in a number of regions of the world, especially in sub-Saharan Africa. Where studies of suicide have been carried out, rates in low- and middle-income countries parallel those in much of the West (Moshiro et al. 2001). Suicide is, of course, not the only cause of premature mortality. Mental disorders also carry an equivalent significant premature mortality from other causes such as infectious diseases, respiratory disease, cardiovascular disease and malignancy (Harris and Barraclough 1998). Nutritional deficiencies and a wide range of infections also have their primary impact on the nervous system.

MNH and the MDGs

MNH and poverty

It has been argued that, despite the epidemiological transition occurring across the world from communicable to noncommunicable diseases, the noncommunicable diseases are nonetheless suffered principally by rich people and that health efforts should still focus primarily on communicable diseases. However, mental and neurological illnesses, besides being highly prevalent and disabling, with a significant mortality, are more common in poor people than in rich people. Furthermore, mental illness and mental health are relevant for the control of communicable disease. Mental and neurological disorders perpetuate the cycle of poverty. They interfere with the capacity to work and to function in non-wage roles, thus leading to decreased social and economic productivity. Poor populations also experience a higher frequency of a wide range of behavioural problems (unsafe sexual practices, smoking, substance abuse, domestic violence, destructive behaviour, inappropriate diet, failure to use seat belts, etc.) that greatly increase the risk of ill health or injury from other conditions.



Mental illness differentially affects the poor. A combined analysis of five recent surveys from Brazil, Chile, India and Zimbabwe reveals a consistent relationship between poverty and common mental disorders (Patel et al. 1999). The data also suggest associations between other indicators of impoverishment, such as hunger and indebtedness, and mental disorder. In Indonesia, lower rates of depression and other common mental disorders were related to higher levels of education and access to amenities such as electricity. This association applied to communities as well as individuals. The least developed villages surveyed had common mental disorder rates of 28 per cent compared with 13 per cent in the most developed villages (Bahar et al. 1992). A study in Pakistan also found a firm relationship between poverty and mental illness (Mumford et al. 1997).

Poverty is a key influence on most of the social, psychological and biological factors that cause mental illness. Life events such as threat of loss or actual loss, the death of a family member, marital separation, maternal deprivation or loss of employment have been shown to cluster before the onset of mental illness and also to influence the course of illness in both developed and developing countries (e.g. Hussain et al. 2000). The unsafe and unhygienic living conditions of many extremely poor people – inadequate shelter, no control over sewage, limited access to safe drinking water, overcrowding and resultant exposure to infectious agents and environmental toxins – can cause developmental disabilities and epilepsy. Micronutrient deficiencies in mothers can cause developmental disabilities in their infants, e.g. folic acid deficiency and spina bifida, iodine and cognitive deficits, vitamin A deficiency and blindness. Chronic hunger leads to anxiety and depression, while high infant and child mortality can have significant psychosocial effects on parents and other family members.

MNH and education

A recent systematic review of large-scale epidemiological studies in the West has found a consistent relationship between rates of mental illness and indicators of social disadvantage, including low income, education, unemployment and low social status (Fryers et al. 2003). Epidemiological studies in low-income countries find the same relationship (e.g. Patel et al. 1999). Mental disorders have implications for a number of other sectors, especially employment, education, social welfare and criminal justice. Recent epidemiological studies in Burundi, Kenya and Tanzania indicate that mental distress and mental disorder are associated with lower levels of education, reduced social functioning, increased rates of physical disorder and increased rates of unemployment (e.g. Baingana et al. 2004).

In the Burundi study (Baingana et al. 2004), boy children in households with a person with mental distress were significantly less likely to go to school. The same study found that educational attainment had a strong dose-response relationship to distress levels, those with higher levels of education having lower levels of distress.

Children with emotional disorders and learning disabilities are often not recognized; they are the ones who frequently repeat classes, drop out or perform poorly at school. Orphans and other vulnerable children, such as ex-combatants, street children and

children in child-headed households, have increased rates of mental disorder due to the risks they live with every day and the lack of social supports. Their mental health needs should be addressed in any rehabilitation programme.

MNH and gender

Schizophrenia is as common in men as in women, substance abuse is more common in men, and depression is more common in women. Men tend to have higher rates of suicide than women (the exception is in China and is probably due to the availability of lethal pesticides which are used by young women who attempt suicide; but, given the products' lethality and reduced access in some regions to effective accident and emergency services, the attempts are often fatal).

Many women suffer from postnatal depression immediately after childbirth. Research on postnatal depression in poor countries suggests rates of 10–36 per cent of new mothers. Postnatal depression is of great public health interest because it may result in adverse cognitive, emotional and physical outcomes for children.

Women may be more exposed to certain risk factors than men. The consequences of rape and sexual violence may include emotional trauma, depression, physical injury, pregnancy, sexually transmitted infections (STIs) and death. Involuntary prostitution occurs when women are lured into sexual slavery through promises of marriage or work. Female genital mutilation, forced sterilization, involuntary abortion and partners who demand unprotected sex also contribute to emotional trauma and depression. Rates of depression are higher in caregivers for AIDS and other disorders. Caregivers are usually women. The impact of HIV/AIDS on women's mental health is likely to be enormous in countries such as Zimbabwe, where 30 per cent of pregnant women attending antenatal health clinics were found to be HIV positive. In such situations, women must cope not only with illness in their male partners, but also with their own failing health and that of their children.

Women are overwhelmingly the targets for domestic violence. This is a largely hidden problem but routine battering is estimated to affect 25 per cent of women across diverse cultures, and this rate is often much higher in certain groups. It is frequently alcohol related. Domestic violence resulting in death occurs through dowry deaths of brides in India and female infanticide in India and China.

Male victims of violence are likely to suffer disabling and long-lasting health effects such as depression and PTSD, as well as dissociation disorders, somatization, sexual dysfunction and self harm.

Older women in poor societies are often vulnerable to personal abuse, isolation, suicide and stigma associated with accusations of witchcraft, particularly when issues of land ownership are disputed.

In countries of the former Soviet Union, a trend in excess mortality among men has been noted. Causes of death include suicide, injuries, alcohol and drug abuse, and

cardiovascular accidents. The etiology is thought to be the increased stress resulting from the transition, manifested by an increase in risky lifestyles (Paci 2002).

MNH and child mortality

Mental and neurological health impacts on infant and child mortality, which can be reduced through improved treatment of postnatal depression. Reduced depression has proven links with increased compliance with important medical programmes such as antenatal care, vaccination programmes, prevention and treatment of infectious diseases, and rehydration therapy for diarrhoea.

The mental health of mothers is integral to the health and nutritional outcomes of their children. Women with depression report difficulty in caring for their children, miss routine well-baby appointments and their children are more likely to have depression or behavioural problems, nutritional disorders and health problems.

Treating maternal depression improves compliance with vaccination, nutrition, oral rehydration and hygiene regimes to reduce infectious diseases in children.

MNH and maternal health

Treating maternal depression also reduces maternal mortality through decreased rates of suicide, cancer (less smoking, better nutrition) and improved physical health through better mental well-being. HIV infection rates for the 17–24 year age group are reduced because improved mental health reduces promiscuity, unsafe sex and levels of drug usage and addiction.

MNH and HIV/AIDS, malaria and other diseases

HIV enters the brain shortly after first infection, leading to malignancy, opportunistic infections, vascular lesions and encephalitis. In advanced HIV, there is chronic loss of general cognitive function, leading to apathy, withdrawal and deterioration of personality. As in other major life-threatening illness, AIDS has a high frequency of adjustment reaction, persistent depression, affective psychosis and suicidal risk.

There is a need for more research on mental health promotion in schools to reduce the risk of contracting HIV through unprotected sex or drug use, to support girls to be assertive and confident in ensuring their sexuality and safety, to address particular difficulties in countries where the use of condoms is not widely and/or culturally accepted by men, and to encourage abstention from drugs and harm reduction in those who use drugs.

Many people with depression and anxiety present with somatic symptoms, which may often be misdiagnosed. If not diagnosed and treated effectively, there is a high rate of repeat consultations, placing an additional burden on health-care systems. A multi-country study of people attending primary care showed that 30 per cent had

mental disorders, and most remain undiagnosed or were erroneously diagnosed as having a physical illness (Ustun and Sartorius 1995). In sub-Saharan Africa, many are misdiagnosed as malaria, typhoid or amoebiasis. In a study in the Kariobangi health centre in Nairobi, Kenya, Kiima (1987) found that 44.8 per cent of patients attending the clinic had psychiatric morbidity, predominantly anxiety and depression. All these patients were misdiagnosed by the primary care workers. This misdiagnosis and mistreatment of common mental disorders may contribute to the widespread resistance to antimalarials as well as draining the scarce health resources.

Mental health and mental illness issues are so inextricably associated with delivery of physical health targets that it makes sense to address them in concert with other physical health priorities such as malaria, HIV and TB. A number of physical health programmes report difficulties in obtaining good consultation rates and compliance from those who would benefit. Studies have found that compliance greatly improved when depression was treated, when it was co-morbid with TB, HIV/AIDS or stroke, and led to a decrease in mortality and better survival rates. There is, therefore, a need for a partnership between communicable and noncommunicable diseases.

MNH and global partnership for development

The contribution of better health goes beyond reduction of clinical symptoms and disability, greater workplace productivity and the lost productivity of carers. The economic benefits of cohesive social functioning have led to the recent interest in social capital. Cohesive and productive groups of individuals are considered to be more than just the sum of their human capital. There is increasing research demonstrating that social capital adds a critical element to sustainable development. Social capital influences country productivity and trade, and reduces transaction costs. Communities that possess more social capital tend to have higher productivity, facilitated by improved coordination and cooperation and a reduction in the cost of doing business. There is an extensive literature spanning many decades on the relationship between socioeconomic variables, social networks, life events and mental health. Individual and population interventions that improve a person's mental health will enhance the individual attributes necessary for constructive social interaction and for the assumption of a productive social role, and will contribute to the building of social capital in a country. For example, research in Cambodia and Rwanda demonstrated that an increase in individual attributes such as interpersonal communication, trust and resilience contributed to the rebuilding of social capital in the post-conflict progress of both countries.

What is the scope for alleviating the burden of MNH?

There is now a considerable knowledge base for effective interventions (health promotion, prevention, treatment, rehabilitation and prevention of mortality) for many mental and neurological conditions in the developed world, and a growing number of studies in low-income countries, although studies of cost-effectiveness are particularly sparse (Shah and Jenkins 1999). However, this knowledge is not

implemented in many parts of the world for a variety of reasons including lack of mental health policy, lack of specialist services, lack of skills in primary care and lack of availability of essential medicines and treatments.

There is also a lack of utilization because of stigma about mental and neurological disorders – frequently more prevalent in developing countries than in the West.

Promotion

There is evidence from the West on the value of strengthening or increasing individuals' emotional resilience through interventions designed to promote self-esteem, life and coping skills, communicating, negotiating, relationship and parenting skills, and skills to improve the capacity to cope with life events, transitions and stresses, such as parenting, bereavement, redundancy, unemployment and retirement. Early child interventions have been found to be crucial to optimizing cognitive development and the future performance of children in school, as well as early recognition of any problems.

There is a need to strengthen communities by increasing social inclusion and participation, improving neighbourhood environments, developing health and social services that support mental health, anti-bullying strategies at school, childcare schemes, workplace health, community safety, and supporting and facilitating social and self-help support networks. Also important is reducing structural barriers to mental health through initiatives to reduce discrimination and inequality and to promote access to education, meaningful occupation, adequate housing, and appropriate services and support for those who are vulnerable, e.g. people with disabilities, people who are chronically ill, refugees, immigrants and prisoners. Addressing stigma and discrimination in relation to mental disorders is crucial to promoting mental health.

A strategic approach to mental health promotion should, therefore, aim to include a balance of developing coping skills (e.g. parenting, communication, promoting social support) and networks (e.g. tackling bullying, supporting bereaved families, facilitating self-help groups) and addressing structural barriers to mental health in areas such as education, employment and housing.

Primary prevention

Prevention is critical in reducing the impact of mental disorders and alcohol abuse. On ethical grounds alone, prevention is always preferable to treatment or rehabilitation. In most instances prevention is also more cost-effective than treatment. Many potentially catastrophic disorders are now preventable. Examples include iodine supplementation to prevent mental retardation and iodine deficiency disorder; immunization against tetanus, TB, measles, rubella and polio; and zinc, folic acid and iron supplementation and fortification. Prevention of maternal transmission of HIV is increasingly critical. Safe motherhood initiatives also greatly reduce the impact of prenatal, perinatal and postnatal risk factors.

Preventive, community-wide psychosocial programmes have been shown to be effective, especially for populations affected by conflict and HIV/AIDS. These include childcare centres for orphans and vulnerable children, “kids clubs”, school-based mental health programmes and community support groups.

Recently, short-course antiretroviral prophylaxis regimens have been shown to provide a relatively low-cost and effective strategy for preventing vertical transmission of HIV in low-income populations. This, in conjunction with supplemental feeding, further reduces the transmission through breastfeeding by another 30 per cent, thus preventing the neurological and developmental disabilities associated with HIV infection in children.

Depression

Effective treatment strategies exist for depression in the form of pharmacological, cognitive behavioural therapy and psychosocial treatments. Treatment interventions are curative for most, but not all, forms of depression, and efficacious and low-cost treatments are available. Despite the availability of these interventions, many people in Africa remain undiagnosed and untreated.

Because of their efficacy and cost-effectiveness, antidepressant medications represent the mainstay of treatment for depression in developed countries. Seventy per cent of patients prescribed antidepressants show significant clinical improvement. Antidepressants are also effective in prophylaxis: treatment has been shown to reduce the relapse rate for recurrent depression from 80 per cent (when untreated) over three years to 22 per cent. There has been far less research in developing countries but the limited available evidence shows similar rates of efficacy. Tricyclic antidepressants (TCA) and the newer selective serotonin reuptake inhibitors (SSRIs) have similar efficacy for moderate depression. The reduced side-effects of SSRIs enhance patient compliance. However, the high cost of SSRIs means that they remain out of reach as a first-line treatment in Africa for all but wealthy individuals. Indeed, simply ensuring an adequate supply of TCAs, which are cheap, to primary care across sub-Saharan Africa still represents a major financial challenge for these countries. The median yearly cost for treating depression with amitriptyline in the sub-Saharan Africa region is US\$ 30.66 (WHO 2001b).

Bolton et al. (2003) tested the efficacy of group interpersonal psychotherapy in alleviating depression and dysfunction in rural Uganda and found it to be highly efficacious. Mean reduction of depression severity was 17.47 points for intervention groups and 3.55 points for controls. After the intervention, 6.5 per cent of the intervention group and 54.7 per cent of the control group met the criteria for major depression compared with 86 per cent and 94 per cent respectively.

Cognitive behaviour therapy, problem-solving therapy and family-focused therapy have met with proven success in the treatment of depression. A small number of published reports address the use of psychosocial interventions to treat depression in developing countries. Problem-solving therapy has been suggested as an effective

psychosocial treatment, particularly as it seeks to provide the patient with a technique for coping with future problems, thereby potentially preventing a recurrence of depressive symptoms or enabling the patient to deal with them more effectively when they recur. Problem-solving therapy has been conducted effectively by trained community nurses in primary care settings, making the approach particularly attractive for resource-poor settings, where psychiatrists and specially trained general physicians are not available.

Schizophrenia

Evidence suggests that correct early diagnosis and initiation of treatment can have a positive impact on the subsequent course of schizophrenia. Antipsychotic medication is the mainstay of treatment and is indicated for the majority of patients over prolonged periods with no fixed limit to duration. Two classes of pharmacological agents are available. Both offer approximately equal efficacy in controlling the positive symptoms of the disorder, but differ considerably in their side-effects and tolerability as well as cost. The median yearly cost for chlorpromazine for sub-Saharan Africa is US\$ 40.88 (WHO 2001b).

Post-traumatic stress disorder

A combination of psychosocial and mental health interventions is recommended for PTSD. Psychosocial interventions include counselling, group support meetings, play activities, art, music and other expressive art therapies. Mental health interventions include a short course of anxiolytics for acute distress, not to be taken for longer than two weeks. Symptoms that persist beyond the acute phase respond to smaller doses of antidepressants and antipsychotics. Drug treatment for PTSD is best combined with a psychotherapeutic intervention such as group therapy or individual therapy/counselling.

Mental disorders among children

The first step in the management of mental disorders among children is making the correct diagnosis. Management is also dependent on collaboration between the parents/caretaker, teachers and the health-care provider. Treatment will depend on the diagnosis and the underlying causative factors. Antidepressants are effective in the management of emotional disorders of children. However, teachers would have to be aware of the diagnosis and provide support within the school system. For children with learning difficulties, special-needs education teachers have a crucial role in providing education tailored to the needs of the child.

Conclusion

Mental and neurological disorders matter because of their impact on human capacity, poverty, social capital, economic productivity and the achievement of the Millennium Development Goals. Mental and neurological disorders attack the intrinsic human abilities to think, feel and communicate, and they erode social and physical functioning in all areas of life. People living in poverty are more likely to suffer from mental health problems and neurological disorders. Poor mental health can have a severe impact on ability to earn, and therefore contributes to the poverty cycle. Progress towards achievement of the MDGs will be enhanced by adequate attention to tackling MNH.

Chapter 3

Integrating care of brain disorders into health-care systems

Over the last century, health care has increasingly emphasized disease prevention as well as treatment. In developing countries, the need to provide affordable, accessible care for whole populations has guided the development of health systems based on primary care. The 1978 International Conference on Primary Health Care produced the Alma-Ata Declaration, a widely accepted strategy that defines primary health care as essential, universally accessible health care based on practical, scientifically sound and socially acceptable methods and technology, at a cost that the community and country can afford to maintain at every stage of development (WHO 1978). Primary health care comprises the central function and focus of national health systems and is an integral part of the social and economic development of communities (Ustun and Gater 1994).

Prior to the Alma-Ata Declaration, WHO convened an Expert Committee on Mental Health in 1974. This committee recognized the scarcity of trained mental health professionals and the need for a tiered approach: treatment that is grounded in communities by non-specialized health workers, primary care nurses and physicians who are linked to available specialist resources. Epidemiological research and programmatic development over the last 25 years have been guided by these findings.

However basic the staff and facilities, primary care represents the point of entry for the vast majority of people seeking medical care – and for many people, their sole access to medicine. Thus primary care is the logical setting in which brain disorders can begin to be addressed. Including care for brain disorders in the primary care agenda represents the surest way to promote their prevention, early detection and timely treatment (Mehrya and Khajavi 1974–75). The integration of neurological and psychiatric services with primary health care is already a significant policy objective in several countries (Norquist and Hyman 1999).

As the gateway to health services in most middle- and low-income settings, primary care centres are well placed to recognize brain disorders and facilitate diagnosis and treatment of coexisting physical and psychological symptoms. Research indicates, for example, that people with severe mental illness suffer higher-than-average rates of mortality from cardiovascular and respiratory diseases, cancer and – in low-income countries – infectious diseases. In addition, findings show that patients with psychiatric disorders seek care from primary providers with greater-than-average frequency due to increased rates of physical illness, as well as to somatic symptoms of psychiatric illness (von Korff et al. 1997). Moreover, because they work in the community, primary care teams are well placed to recognize factors, such as stigma, family problems and cultural issues, that affect treatment for brain disorders, and to deal with these complications for individual patients and the community.

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Primary care

Limited yet significant evidence from the developing countries that have established services for neurological, psychiatric and developmental disorders in conjunction with established primary care services indicates their general feasibility and cost-effectiveness. In resource-limited communities, primary care services may provide diagnosis and, in many cases, treatment for brain disorders at the first point of entry into medical care, in conjunction with secondary and tertiary support (Giel et al. 1981). The following are descriptions of several essential positions for such a system:

- **Community health workers.** In some communities, community health workers provide primary care services. These workers need a minimum of some high-school education and basic training in health care. They also require additional training in the diagnosis and treatment of brain disorders, the use and monitoring of medication, support for community rehabilitation, prevention of disorders, and means of reducing stigma and discrimination. Their role is to recognize patients who may need neurological or psychiatric care; to consult regularly on such cases with a specialist nurse or physician; and to provide care, under the supervision of a physician or specialist at the closest secondary care centre.
- **Nurses.** In some communities, nurses provide primary care services under the supervision of a physician or specialist at the closest secondary care centre. Their qualifications typically include a high-school education and general nursing training, as well as some specific training in neurological and psychiatric care. Specialist nurses have extensive training in neurological and psychiatric care, and in some countries make monthly or other regular visits to provide oversight of primary care clinics.
- **General physicians.** While it is not possible to have physicians or specialists present in many primary care facilities, those working at secondary and tertiary centres of care have an essential role in the planning, training and oversight of each primary care centre. The same physicians provide care for severe or complex cases that are referred from the community level and, whenever possible, for the initial diagnosis and treatment of critical or chronic cases.
- **Specialists.** Specialists in neurology, paediatrics and psychiatry, as well as related fields such as psychology, physiotherapy, social work, occupational therapy and speech therapy, have several roles in the control and management of brain disorders in developing countries. First, they can contribute to the formulation of relevant health-care policies, bringing to bear their specialized knowledge about cost-effective methods of control, treatment and rehabilitation. They may also oversee policies and procedures at various levels of health-care facilities, staff training and programmes designed to monitor and improve health care.

The role of secondary and tertiary care

Treatment of some brain disorders requires medical expertise and technology that are not available in a primary care setting, particularly in developing countries (Singhal 1998). When such cases are recognized in a primary care setting, early intervention at a higher level of care can provide the best chance for successful treatment or

rehabilitation, thereby avoiding the potentially costly complications that arise when these more serious conditions are not addressed until they have reached a critical state.

Secondary care is provided in district or regional hospitals, each of which serves a regional population. Unlike primary care centres, these facilities are capable of treating severe or complex medical conditions. Several general physicians, medical technicians and nurses generally staff these hospitals, which may contain equipment such as computed tomography (CT) scanners, heart monitors and incubators, as well as laboratory facilities for blood analysis. District and regional hospitals can also support care for a broader range of illnesses than can be treated in primary care alone. This approach could be adapted to include care for schizophrenia, depression and other disorders along with the provision of periodic and continued supervision and training.

Secondary care centres could also provide technical and administrative support for primary care clinics in their district or region. Continuing education, which has been shown to improve the performance of community health workers, should include instruction on the symptoms of major brain disorders and ways to help patients maintain proper treatment (Sokhela and Uys 1999). This training could be provided by medical professionals from secondary facilities who, during regular visits to primary care centres, also monitor the care provided by primary care workers and consult on specific cases.

Tertiary care provides the most specialized diagnosis, treatment and rehabilitation for medical conditions, and is often located in teaching hospitals for physicians and specialist nurses. Tertiary care centres also serve as facilities for clinical research, epidemiological data collection and analysis, and the creation and distribution of health educational materials.

Because resources for health care and research are limited and the operating costs of tertiary centres are high, most developing countries can support only a few such centres. However, studies conducted at these influential centres – on such topics as the identification of risk factors, prevention strategies and treatment options, as well as the evaluation of prevention and treatment strategies in hospital and community settings – can provide the evidence base for national health priorities and community health care. The training curricula developed at these centres can guide health care at secondary and primary levels.

Building capacity through training

A key aspect of expanding existing health-care services to address brain disorders is the training of staff. Since the responsibilities of community health workers, nurses and physicians are likely to vary widely among developing communities, the training provided must be tailored to the needs of specific countries or regions. A general training framework, based on existing evidence on the provision of good-quality health care in developing countries, would include:

- **Community health workers.** As front-line caregivers, health workers need to receive both basic training and regular continuing education in basic medical information, basic diagnostic skills and basic treatment and rehabilitation protocols. Basic training in neurological and psychiatric care should cover both general and specific skills. General skills include interviewing a patient, recording appropriate information, referring a patient to a higher level of care and consulting with a physician who oversees the centre, as well as diagnosis and management of specific disorders, including the use and monitoring of medication (Meursing and Wankiiri 1988).

While directed at skills more than knowledge, training should raise health workers' awareness of the importance of psychosocial factors in health and disease. Flowcharts and simple screens can be effective for training primary care providers to recognize developmental disabilities, depression, schizophrenia, epilepsy, common mental disorders and stroke; these diagnostic and management tools must be adapted to local conditions. Primary care providers are likely to find assessment tools that have a direct bearing on ameliorative action (e.g. symptom and behaviour checklists) more useful than instruments that do not indicate the action needed (e.g. intelligence tests). In many cases, primary care providers should recognize the need for referral to more specialized treatment.

- **Nurses.** Primary health care in low-income countries has always relied heavily on nurses, but they could play an even larger and more fundamental role in the system of care envisioned here. Physicians in secondary care facilities in developing countries may spend only a few minutes per patient visit; under these conditions, it is unrealistic to expect that they could diagnose any but overt cases of brain disorders. Nurses trained to conduct more detailed first interviews may be better able to recognize common mental disorders such as depression, and to identify risks for stroke, such as hypertension and diabetes (Murthy and Wig 1983).

In regions where there are few physicians in primary care, specialist nurses may be called on to diagnose and treat brain disorders; however, such efforts are likely to fare best if overseen by neurologists and psychiatrists. Primary care nurses also have many opportunities to promote brain health through the management of emotional distress, smoking cessation and healthy diet; those who attend to new mothers can alert physicians to possible cases of postpartum psychosis and severe depression.

- **Physicians.** Physicians undergo most of their medical training in teaching hospitals, where tertiary health care is emphasized; those who supervise primary health-care personnel will need to gain experience with the diagnosis and treatment of disease as typically seen at that level. Relevant training should emphasize preventive measures against such brain disorders as mental retardation and stroke and provide interview skills that can facilitate the diagnosis of depression and other psychological disorders. General physicians should be able to evaluate and treat common neurological and psychiatric disorders and respond to emergencies such as head injury, stroke, epileptic seizure and psychotic episodes. A programme to improve training in neurological disorders for primary care physicians in developing countries was launched in 1997 by WHO and the World Federation of Neurologists (Janca et al. 1997).

Physicians who supervise or train other primary care providers also need effective communication skills so that they, in turn, can instruct community health-care workers in a wide range of topics. The supervising physician should regularly consult alongside workers and receive case referrals from them. Given the increasing recognition of the common origins of many brain disorders, psychiatrists should be conversant in neurology and exposed during their training to patients with neurological disorders; likewise, neurologists should have a basic command of psychiatry and experience with patients suffering from major mental disorders (Price et al. 2000).

Collaboration with other health and non-health sectors

Private physicians

Over the last two decades, numerous development bank aid programmes have required the decentralization of health-care services in many developing countries. The growth in private health-care facilities as a result of these initiatives has created an important role for this sector in addressing brain disorders. In India, private practitioners are estimated to provide half of all primary care, and up to 80 per cent in some states (Chisholm et al. 2000a). Many poor people from both rural and urban areas consult with private practitioners because of their relatively low consultation fees and accessibility, as well as the negative perception of public health care.

The ability to consult with a private physician varies among countries. In the least developed regions of India and sub-Saharan Africa, which tend to be underserved by government-provided health care, the principal providers are community-based NGOs, which offer such care as part of a broader development agenda. Some NGO providers focus on specific areas of mental health, attempting to fill needs unmet by both public and private health care. In many developing countries, outreach to and participation from the community of private physicians will be important to the success of public education, prevention and treatment initiatives aimed at brain disorders. Comprehensive operational research to establish appropriate training requirements, cost-effective interventions and future research needs will be most useful when the services provided by private physicians are considered along with public health system measures (Chisholm et al. 2000b).

Schools and educators

When developmental and other brain disorders occur in children, educators may be the first to recognize them. Such vigilance can be encouraged through consultations between teachers and primary care providers. Schools can also include neurological and mental health education, as they do physical health education, in the curriculum. In India and Pakistan, for example, schoolchildren learn to identify adult relatives with epilepsy, schizophrenia and other disorders and bring them to medical attention. (Chisholm et al. 2000a). These programmes reinforce the potential role for teachers in identifying children with disorders such as epilepsy and developmental disabilities.

Research is needed on how teachers can best facilitate the early diagnosis and treatment of brain disorders in children.

Community-based rehabilitation programmes

Community-based rehabilitation (CBR) programmes are a low-cost way to coordinate medical guidance and community resources in the mental and physical rehabilitation of children and adults with disabilities, allowing them to live as normally as possible. Some of the most successful CBR programmes work to mainstream children with disabilities into public education at the earliest opportunity, and to assist them in the transition from school to employment. In addition to providing long-term care and support, CBR addresses the isolation and stigma experienced by people with disabilities. The programme can be linked to and supported by institutional and hospital-based programmes, thereby creating a comprehensive rehabilitation service (Kilonzo 1992).

Community organizations

Local groups – although relatively few and often poorly funded – can facilitate mutual support and sharing of experience among patients, families and caregivers. NGOs and parent groups together can establish facilities, such as vocational training centres, day-care centres and supported living facilities, most of which are staffed by community volunteers. Groups such as the Kenya Association for the Welfare of Epileptics and Zimcare, an organization for the support of people with mental handicaps in Zimbabwe, can work to change social attitudes and draw the attention of policy-makers to patients with disabilities.

Traditional healers

Many people in developing countries seek care for brain disorders from traditional healers (Jenkins 1998). Although a scientific basis and empirical evidence for their efficacy may be lacking, there is little doubt that some aspects of traditional healing benefit patients (Kleinman and Gale 1982). Most community health workers and other care providers in developing countries are in regular contact with traditional healers and are aware of their practices (Patel et al. 1997). They may even rely on traditional healers for their own mental health care and experience conflict between traditional and biomedical explanations of disorders (Kleinman and Gale 1982).

In defining their relationship with traditional healers, providers of biomedical care must address several issues. First, they must determine how to protect patients from intrinsically harmful traditional practices. The education of patients about the negative effects of some traditional treatments can be an important role for physicians, nurses and health-care workers. Second, they must determine whether patients are simultaneously taking orthodox and traditional medicines in order to prevent overdose or dangerous side-effects (Gater et al. 1991). Providers of

biomedical care can also recognize and incorporate traditional practices that are benign or potentially helpful into protocols for care (Gater et al. 1991).

Some developing communities have created beneficial alliances between biomedical care providers and traditional healers (Richeport 1984). In Nepal, where allopathic psychiatric care coexists with traditional healing, healers attend community education courses on mental health, which are organized by NGOs. Through such courses in Nigeria, healers have been trained to recognize and manage cases of psychiatric disorder and refer them to community health workers. Operational research on such collaborative efforts may identify opportunities in other countries seeking to facilitate constructive cooperation with traditional healers.

Where resources for primary health care are extremely limited, traditional healers, who vastly outnumber community health workers, can be recruited and trained to provide primary care (Patel 1996). Training those who currently provide care can be the fastest way to increase the capacity to treat brain disorders (Chisholm et al. 2000a).

The cost of integrating services

Existing limited evidence coupled with further operational research can guide public investment to permit the expansion of primary health care to include care for brain disorders (Chisholm 1999). A timely investment in personnel, training, drugs and infrastructure is key to preventing or reducing the impact of these disorders on individuals, their families and society. Treatment of these disorders is also the surest means of reducing the stigma associated with them and replacing archaic beliefs with contemporary understanding.

Determinations of the appropriate level of effective, affordable care for brain disorders should be based on cost-effectiveness analyses for a range of treatments in different systems of health care. Considerable variability among communities in their perception of neurological and psychiatric illness, their expectations of what medical care should provide and the cost of drugs and other services complicate choices for good-quality, affordable services. Optimal approaches to treatment and prevention need to reflect local costs and benefits.

Health-care economists generally agree on the methodology for establishing the cost-effectiveness of alternative approaches to health-care delivery (Gold et al. 1996). Briefly, such analyses compare interventions for health promotion, prevention, diagnosis, treatment and rehabilitation on the basis of outcome and cost. However, analyses depend on data, of which little is currently available. Appropriate databases for systemic analyses of cost-effectiveness in primary care can be built through a review of existing data, followed by the establishment of a multinational collection of information based on a common framework. New information should be collected in local studies that include comparisons of financing, costs and service utilization, as well as rigorous assessments of cost-effectiveness (Gulbinat et al. 1996).

Once neurological and psychiatric care has been incorporated into a system of health care, maintaining a cost-effective programme will require monitoring, evaluation and comparison with new alternatives. Research to establish the cost-effectiveness of treating brain disorders will be a key element in persuading governments, missions and NGOs that incorporating these services into health-care programmes is affordable and necessary for the health and well-being of individuals, families and the community.

Building research capacity through collaboration

The expansion of primary health-care services to include cost-effective neurological and psychiatric care demands increased capacity not only for care delivery, but also for research. A robust research agenda to inform and support primary care should include operational studies to test techniques and strategies for their effectiveness in the local setting, along with epidemiological surveillance. Such a programme could also promote the development of an international cadre of neurological and psychiatric professionals focused on these issues for developing countries. A successful model for such a research programme, the WHO Special Programme for Research and Training in Tropical Diseases, could be adapted for this purpose.

Efforts to increase health-research capacity in developing countries also include national and local programmes focused on health problems such as HIV/AIDS and on training in health and behaviour research. Several participants in collaborative efforts to build health-care research and delivery capacity in developing countries have emphasized the importance of involving local researchers and policy-makers in programme design and implementation. A key means of accomplishing this goal is through the training of local researchers to assume responsibility for directing and sustaining national research programmes. The ultimate goal of training, however, should be the establishment of research institutions in developing countries that can grow, mature and participate as equals in international networks of scientific exchange (Morrow and Lansang 1991).

Two principal means of collecting epidemiological data for health-care planning purposes are surveys and record-keeping at the primary care level. Given the diverse means by which people in developing countries obtain primary care, surveys that attempt to determine the extent to which patients with brain disorders make use of various health-care providers, as well as surveys of the prevalence of specific neurological and psychiatric disorders among the general population, should prove especially useful. Research on pathways to health care can reveal areas for improvement in the efficiency of treatment and referral in health-care systems.

Policy implications

National policy

In formulating health-care policy, governments rarely start with a clean slate. It is, therefore, important not only to appraise national needs for the care of brain disorders, but also to identify resources and strengths that can be directed towards new goals. Experience even in resource-poor countries indicates that when a robust national policy of primary care is in place, it can be expanded successfully to address additional types of care. As discussed previously, established mental health programmes represent the logical starting point for addressing a broader spectrum of brain disorders. Additionally, where collaborative efforts exist between the health and non-health sectors (e.g. education, environment, social welfare), these relationships should be reinforced and expanded (Jenkins 1998).

Many developing countries have made significant investments in specific disease-control initiatives and in primary care infrastructure for infectious diseases and maternal and child health. They have also expanded these programmes to meet broader health-care needs. In Iran, for example, a programme of childhood immunization, which began as a vertical, stand-alone project, achieved greater success when integrated into the existing system of primary health care. Such programmes of integrated care could, with appropriate expertise and oversight, be augmented to include the prevention, identification, treatment, rehabilitation and surveillance of brain disorders. At the national level, policies to implement the integration of care for brain disorders into primary health care must address a variety of issues:

- **Strategies for prevention.** Two basic approaches to preventing brain disorders require the support of national policy: public education and reduction of known risk factors (Singhal 1998). Although education occurs at the community level, the training of community health workers in educating their clients and the community at large about the nature and causes of brain disorders should be supported by national health policy. The control of known and preventable risk factors for brain disorders, as well as efforts to identify and strengthen protective factors, should also be emphasized at the national level.
- **Strategies for intervention.** While each community should define its health-care priorities, national policy can support this process by establishing uniform standards and protocols for the care of specific disorders based on best-practice guidelines, and by undertaking data collection and information distribution. Governments should also coordinate care among all tiers of the health-care system, recognizing the importance of oversight of primary care centres and their connection to secondary and tertiary care by physicians or specialists at district or national facilities (Schoenberg 1982). Policy should guide the progress of patients who need advanced care along pathways that will ensure the earliest appropriate intervention.
- **Priority setting.** To make optimal use of limited health-care resources, countries may find it beneficial to enact policies that will guide each community in formulating and updating its health-care strategy. To the extent possible, these policies should be based on evidence of cost-effectiveness. For example, since

early detection and treatment of many brain disorders tends to reduce their severity and prevent recurrence, training guidelines for community health workers should stress these practices. Likewise, policies that target people at high risk for brain disorders are likely to make efficient use of limited resources for primary health care. The treatment and especially prevention of brain disorders in children should receive particular emphasis, since this represents an important means of reducing long-term disability and overall disease burden.

- **Training.** Governments should establish standards for the training of health-care personnel at all levels to build a strong foundation for a primary care system. National training policies should also reflect the importance of continuing professional education for primary caregivers, as demonstrated in several studies in developing countries. Although such training may be organized by local health services, it could be encouraged through national policies that make available such resources as quality instruction, access to journals, distance learning, lectures and workshops.
- **Monitoring of health-care delivery and outcomes.** The surveillance of brain disorders and their care, including data collected in primary care settings, provide a basis for evaluating the effectiveness of prevention, diagnosis and treatment practices. National policy should therefore support the collection, analysis and dissemination of information on health-care outcomes (Lorenzo 1994).

Local policy

Community involvement in the development of health services tends to promote self-reliance and has been shown to increase demand for health-care services. Because district medical officers and their staff play a vital role in determining local priorities and in implementing plans, brain disorders should have a regular place in the agendas of these officials. Some needs may be met through collaborations between health care and other social services and NGOs, for example, through the creation of day-care and rehabilitation facilities, crisis centres and halfway homes. Areas best addressed by community-level policy include the following:

- **Education.** Community education about the nature of brain disorders can reduce stigma and facilitate care. Programmes should be adapted to community needs, as determined through empirical methods. Explanations of brain disorders should make use of culturally appropriate idioms and constructs to describe clearly the causes of the disease, means of prevention and treatment, and expected outcomes. Community education programmes should be aimed at abolishing harmful local practices and beliefs, such as the ascription of epilepsy, schizophrenia and other disorders to supernatural beings or demons, ancestral spirits, sorcery or witchcraft, as well as the use of dangerous medicinal preparations or ritual treatments (Chisholm 1999).

In some communities, educators may also need to promote public health care so that more people with neurological and psychiatric disorders will make use of this resource. Policy that guides training for educators may include programmes to develop their ability to recognize certain brain disorders in children, such as epilepsy, vision or hearing impairments, and depression.

- **Access to care.** In many communities, especially rural ones, transportation for primary care teams may need to be provided or subsidized by both the community and the health service.
- **Family care.** In the vast majority of psychiatric and neurological cases, the patient's family provides most of the necessary care and in many cases, makes all care decisions. Thus, strengthening the ability of families to support people with brain disorders – and when possible, enabling families to play an active role in the control and management of illness – represents a key strategy in reducing the global impact of these diseases.

International support for systems of primary care

The role of professional societies and international organizations

The international community of health-care professionals can make significant contributions by helping to formulate relevant health-care policies, which can benefit from their specialized knowledge concerning effective and cost-efficient methods of control, treatment and rehabilitation of brain disorders. Policy-makers are often pessimistic about the likelihood that disorders such as schizophrenia and epilepsy can be treated successfully. They may also assign low priority to rehabilitative efforts for these disorders if they believe patients are not likely to be economically productive. Medical professionals can provide a realistic perspective on these issues.

The medical community can also advocate for brain disorders to receive health policy attention commensurate with the contribution of those disorders to the overall burden of disease. Collaborative efforts to control these disorders are most likely to succeed if they involve experts from several fields, such as public health, obstetrics and social welfare. One such programme, the Out of the Shadows campaign for epilepsy awareness, is led by the International League Against Epilepsy, the International Bureau of Epilepsy and WHO. Similar efforts for other disorders have been organized by NGOs such as MINDS, the International League of Societies for Persons with Mental Handicap and the March of Dimes.

WHO has championed many activities designed to improve the services available for people with brain disorders and to reduce the stigma associated with these conditions. UNICEF and the United Nations Development Programme could specifically address vaccine-preventable diseases that cause developmental disabilities through their Expanded Programme on Immunization.

By supporting the Global Burden of Disease study, the World Bank fostered new insights into the worldwide social and economic impacts of neurological and psychiatric disorders. The World Bank and other development banks could advance this frontier by supporting efforts to better estimate the disease burden in different cultures, and by contributing to the building of infrastructure needed to reduce the burden of brain disorders in developing countries.

Provision of essential drugs

The efforts of donors and NGOs are needed to improve the availability of essential medications for neurological and psychiatric disorders in developing countries. About 90 per cent of the 302 products designated essential drugs by WHO are off-patent and available at reasonable prices, and their availability could be increased through a combination of targeted aid programmes and systematic improvements in developing countries' purchasing and distribution systems. Every country needs to have in place an effective screening/approval mechanism for new drugs, a cost-effective purchasing mechanism and an efficient distribution system. To this end, model programmes and international purchasing cooperatives should be encouraged (WHO 1998).

Because of patent protections, several highly effective medications for disorders such as depression, schizophrenia and epilepsy are priced beyond the reach of most people in developing countries. Innovative procurement and partnership strategies designed to ease these problems for certain drugs for which there is no alternative treatment have been developed in cooperation with a number of manufacturers and are currently being tested (IOM 2001). Developing countries, or an international agency purchasing on their behalf, might also arrange to purchase a certain quantity of a drug at a high price in exchange for the option to purchase more at a substantial discount.

National centres for training and research

Many organizations make important individual contributions to strengthening health care in developing countries. However, a coordinated effort is needed to support comprehensive health-care systems that address brain disorders. Established centres in a limited number of developing countries (see Box 3) have successfully developed research and intervention programmes, suggesting that other countries could adapt similar centres to provide a range of services including:

- organization of protocols and procedures for the care of brain disorders in primary, secondary and tertiary care;
- initial and continuing training of instructors, who in turn train community health-care workers on basic care for brain disorders;
- operational research to evaluate the effectiveness of treatments and delivery systems;
- surveillance and monitoring of brain disorders and their risk factors;
- data collection and analysis to support health planning and policy development at the community, primary care, specialist and national levels;
- demonstration projects for evaluating the quality of care provided for brain disorders and its cost-effectiveness for different systems of management in various settings.

Box 3

Established national centres for training and research in middle- and low-income countries

- **Brazil:** WHO Collaborating Centre for Research and Training in Mental Health, Porto Alegre
- **China, People's Republic of:** Institute of Mental Health, Beijing Medical College
- **India:** National Institute of Mental Health and Neurosciences Department of Psychiatry, Bangalore
- **Iran, Islamic Republic of:** WHO Collaborating Centre for Mental Health, Teheran Institute of Psychiatry
- **Mongolia:** Centre for Mental Health, Ministry of Health and Social Welfare
- **Mozambique:** Programme of the Ministry of Health
- **Pakistan:** Institute of Psychiatry, Ain Shams University; WHO Collaborating Centre for Research and Training in Mental Health, Rawalpindi

By serving as resources for knowledge regarding effective prevention and intervention strategies, training programmes and research findings, and by disseminating this information locally, nationally and internationally, national centres would facilitate the exchange of information among medical professionals and policy-makers. This process could be further advanced by collaboration between centres in developing countries and their counterparts in developed countries. The focus of the centres would be on programmes and procedures adapted to national and local settings.

A crucial step towards developing a worldwide network of national centres for training and research is to secure initial funding. Given their broad role, these centres should attract funding from a wide variety of sources, including international donor agencies, foundations, NGOs, development banks, industry and health-care advocacy groups. Two initiatives established by WHO in 1997 – the Action Programme on Mental Health for Underserved Populations and the Global Initiative on Neurology and Public Health – could be key resources. It will be important to ensure, however, that funding for the centres is not diverted from the provision of local health services. With the commitment of the best specialists in the country, these centres can advance the effort to reduce the total burden of disease in the developing world by championing the cost-effective treatment and prevention of long-neglected brain disorders.

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